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ABSTRACT

Papers on audiovisual information resources, the history of technical libraries, online legal information, and information technology for schoolchildren, which were presented at the 1983 International Federation of Library Associations (IFLA) conference, include: (1) "Continuing Issues in the Provision of Audiovisual Information Resources - An Australian View," in which Paul T. McNally (Australia) discusses the need for guidelines on provision of library nonbook materials, national bibliographic control of audiovisual materials, and copyright law reform to enhance use of nonbook materials for research and study; (2) "Library History and the History of Technology: The British Experience," in which K. W. Humphreys (United Kingdom) describes the history of British library collections containing works on technology and the establishment and development of full-fledged technology libraries under the auspices of national, association, government, academic, corporate, and large public libraries; (3) "The Development of an International On-line Legal Information Service and Its Cooperation with Similar Services," in which Nunn Price outlines the objectives, accomplishments, and problems of EUROLEX, which provides online full-text information on European Community (EC) and United Kingdom law; and (4) "Information Technology for Schoolchildren," in which Jean C. Beck (United Kingdom) describes British projects to introduce schoolchildren to microcomputers and information technology, particularly the Schools Information Retrieval (SIR) Project, which resulted in the development of a microcomputer information retrieval system for use by secondary school students. (ESR)

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Continuing issues in the provision of audiovisual information resources - an Australian view.

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Australia's geography and demography greatly influence the provision of all types of library services in the country including those associated with nonbook materials. In an area of approximately 7,682,300 square kilometers, an area equivalent almost to that of continental United States of America, excluding Alaska, some 15,000,000 people are distributed. The majority live in eight capital cities, two of which have populations greater than two million, three in the order of one million and the other three having much smaller populations. Considerable numbers of people also live in several non-metropolitan cities, almost all of which are located on or close to the eastern seaboard.

Provision of library services across the huge distances and to widely scattered population centres poses significant problems. The development of national policies relating to library provision is difficult to achieve given the system of government which operates in the country. Each of the six states and the Northern Territory is self governing. The governments of the States and Northern Territory are responsible for or have considerable influence over the provision of state, public and school libraries. The issue of states' rights is very real and is reflected in the difficulty in getting the various governments to agree to the adoption of common policies on many issues.

In addition to the State and Territory governments, the Commonwealth Government, through the National Library of Australia, provides a range of library services oriented towards meeting the needs of the whole nation. The Commonwealth Government has assumed responsibility for funding the universities and colleges and is thus influential in the provision of library services in those institutions. The distribution of responsibility for library provision amongst so many governments and governmental agencies creates problems reflected in part in the provision of services involving nonbook materials.

Nonbook materials are now widely accepted as important information resources and are generally included in the collections of Australian libraries reflecting the situation that, while the book is the traditional medium for recording knowledge, today there are many other media also used for recording knowledge. Few Australians below the age of thirty have ever known a world without television, films, sound recordings and now, microcomputers. Modern communication media are a normal part of their daily experience.

The exact extent of the availability of nonbook materials in Australian libraries is difficult to identify because of the limited statistics available at present. There are indications, however, that this situation is being improved. The Australian Advisory Council on Bibliographic Services has taken a leading role in encouraging libraries to keep appropriate statistics and in collecting them on a national basis. The Council has expressed its awareness of the need for statistics to be available of library resources to allow formulation of long term policies on library provision and identification of strengths and weakness in the Australian library system through comparisons between states and internationally.

The Council now conducts a census of library resources on a triennial basis with the first census being made for the year ending 31 December 1979. A census for the year ending 31 December 1982 is now going on. Detailed statistics are collected for both book and nonbook materials in all sectors of libraries. The 1979 statistics[(1)] reported the extent of nonbook resources in all types of libraries except school libraries. While the statistics do not provide information on the resources of individual libraries, they do permit cross-sectoral and cross-state comparisons to be made. When the results of the 1982 census become available, patterns in the growth of nonbook collections will become more apparent. The only regularly published statistics of nonbook holdings in individual libraries are those for the libraries of colleges of advanced education published annually as a supplement in

Australian academic and research libraries.

The collection of statistics is hampered by the lack of standard terminology for nonbook materials and standard methods for counting them. Terminology is now less a problem than in previous years. The term "nonbook materials" is now widely used officially and is actively promoted by the Library Association of Australia which has adopted as a definition the following statement -

> Nonbook materials, sometimes referred to as audiovisual or AV materials, include sound, and/or visual materials and machine-readable data files "fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. Such materials include amongst others the following - art original; chart; diorama; filmstrip; flash card; game; globe; kit; machine-readable data file; map; microform, eg. aperture card, microfiche, microfilm and micro-opaque; microscope slide; model; motion picture; picture, eg. art print, photograph and poster; realia; slide; sound recording; technical drawing; transparency; video recording."

Standardisation of terminology has been promoted by the widespread use of the second edition of the Anglo-American Cataloguing Rules published in 1978 which includes recommended media designations for all forms of nonbook materials.

My work as convener of the Audiovisual Services Committee of the Library Association of Australia leads me to believe that the libraries of educational institutions have developed more extensive collections of nonbook materials than have the public libraries. This view is supported by the results of the AACOBS 1979 census of library resources.

The National Library of Australia has exercised an important leadership role in the provision of nonbook materials. Its selection policy[2] emphasises the acquisition of appropriate materials regardless of their media. An extensive section of the document sets out the Library's programme for selection of nonbook resources including maps, motion pictures, video recordings, pictorial material and sound recordings. Growth of the National Library's collection of nonbook materials has been quite spectacular in recent years. For example, in the period 1977/78 to 1981/82 the collection of films and video recordings grew from 34,000 titles to 58,500 and sound recordings from 265,000 to 416,000.[3]

The Last Film Research project, a well-publicised campaign commenced by the National Library in 1981 to locate and preserve early films on unstable nitrate stock, caught the imagination of many Australians and brought to their attention the work of the National Film Archive. In its first year some 300,000 feet of film was located in all sorts of unlikely places and steps taken to preserve it for posterity. Projects such as the Last Film Search serve to make the public aware of the importance of nonbook materials as information resources and encourage use of them for research, study and recreation.

In state and public libraries a number of innovative and interesting projects involving development and promotion of nonbook materials have been established particularly to meet the special needs of physically handicapped people and those living in isolated places. Providing library services to small groups of people widely scattered throughout rural Australia poses many problems. The almost universal availability of audio cassette recorders and the increasingly widespread availability of video cassette recorders in Australian homes has provided opportunities for libraries to provide sound and video recording loan services to people in isolated locations. The work of the Queensland State Library in providing nonbook materials to isolated centres is of interest.

Many public libraries are attempting to cater for the needs of non-readers by providing nonbook materials, particularly video recordings and microcomputer software, thus expanding their clientele beyond the traditional and encouraging library use by many people who would not normally use libraries. Lending video recordings of feature films and other recreational programmes from the collections of public libraries, has brought protests from some commercial organisations which rent video recordings for home viewing. This is likely to be an issue which will become increasingly contentious and public libraries will have to consider their position carefully.

While the provision of nonbook materials in Australian libraries is apparently increasing, no accurate assessment of the adequacy of nonbook resources is possible either qualitively or quantitively until guidelines for the provision of these resources in various types of libraries are developed.

With the exception of Books and beyond[4] published in 1979 by the Schools Commission as guidelines for developing collections of learning resources in school libraries and Cornelius' "Nonbook materials and Australian university libraries",[5] no detailed guidelines for the provision of nonbook resources in Australian libraries have been published. The Audiovisual Services Committee of the Library Association of Australia is well aware of the need for guidelines but because of the magnitude of the task has been unable to undertake their development as yet.

Such guidelines provide librarians developing collections of nonbook materials with important information on the extent of collections necessary to make a significant contribution to the information needs of users, desirable arrangements for the bibliographic organisation of nonbook materials, equipment, storage and user accommodation needs and other services associated with providing a multi-media collection.

Developing a collection of nonbook materials has become increasingly expensive.

The imposition of high levels of customs duties on imported audio and video tapes and cassettes has had a significant impact on the ability of libraries to purchase materials produced outside Australia. The duty, introduced to protect the small home industry involved in the production of audio and video tapes from import of very cheap blank tapes from other countries, has been applied also to imported recorded materials. The matter is now the subject of government review and it is hoped that duties on imported recorded materials will be removed.

Duties are also payable in respect of some other nonbook materials. Such economic restrictions placed on the import of nonbook materials hinders their availability. Customs duties, quotas and currency controls hamper the easy and inexpensive exchange of such materials between countries. The UNESCO Agreement for facilitating the international circulation of visual and auditory materials of an educational, scientific and cultural character[6] (the Beirut Agreement) of 1948 is a positive step forward in improving the universal availability of nonbook materials.

Under that agreement signatory countries facilitate the movement of visual and auditory materials designed to serve the interests of education, science and culture from country to country, by exempting such materials from customs duties, quantitive restrictions and import licences. Unfortunately Australia is not a signatory to the agreement, although attempts are being made to interest appropriate Commonwealth Government authorities in it. The Universal Availability of Publications (UAP) programme sponsored by IFLA would be greatly enhanced by the wider involvement of countries in the Beirut Agreement.

The development of library collections of video recordings has been severely hampered by the costs of those materials. Discussions which have taken place between library interests and distributors and publishers of video recordings now seem to be bearing some fruit, with a consequent reduction in the purchase

price of those items. A major producer of video programmes has recently announced the availability of an important series of educational programmes in VHS format at a price substantially below that normally charged. Continuation of this special price arrangement will depend upon enough sales being made to ensure commercial viability. The relatively small Australian market makes it difficult for producers of all types of nonbook materials to sell their products at a price sufficiently low enough to make them attractive to libraries to purchase and still maintain a commercially viable operation.

IFLA's Universal Availability of Publications (UAP) programme already referred to has as its principal objective achieving the widest possible availability of published materials, including nonbook materials, to intending users. The development of UAP within Australia is as important as its development in an international framework. Certainly Australian libraries have extensive nonbook resources, but their availability to users is relatively limited. Although an item required, say, by a user in Brisbane is held by a library in Melbourne some 1500 kilometers distant, identifying it and organising its loan pose distinct problems.

Within Australia the inter-library loan of nonbook materials is becoming an increasingly common practice. A code for the inter-library loan of nonbook materials was developed by the Audiovisual Services Committee of the Library Association of Australia and now forms part of the Australian Inter-Library Loan Code.[7] The availability of a code with clear procedures to be followed has encouraged libraries to lend nonbook materials and thereby make them more widely available.

Identification of nonbook materials in order to arrange inter-library loans or purchase is hampered by the absence of comprehensive national bibliographic control of nonbook materials. In January 1981 the Library Association of

Australia adopted a policy on national bibliographic organisation of nonbook materials in Australia and has since prompted the implementation of this policy with the National Library of Australia. In summary, the policy recommends expanding the Australian national bibliography to include bibliographic records of works in all nonbook media published in Australia or elsewhere, but about Australia. This objective is slowly being realised as a result of the development of the Australian Bibliographic Network (ABN), an automated national bibliographic service based on a co-operative on-line shared cataloguing facility. Amongst the several aims of ABN is that of developing a comprehensive data base of machine-readable records for all types of library materials including nonbook materials. A working party of experts on nonbook materials has been established by the National Library of Australia to recommend on ways in which ABN should be developed to provide properly the basis for a national data base of nonbook materials.

The Australian Bibliographic Network which commenced operation in November 1981, serves both as a source for cataloguing data and as a union catalogue of the collections of participating libraries. The data base contains entries for books, serials and an increasing number of nonbook materials. By October 1982 over 320,000 holding statements were incorporated in the data base from more than twenty major libraries participating in the network. For participating libraries ABN will provide an increasingly important source of information for the location of nonbook materials in the collections of Australian libraries. As the number of libraries participating in ABN grows, its role in improving the availability of nonbook materials to library users throughout Australia will assume increasing importance.

In addition to the bibliographic services available through the National Library of Australia, libraries have access to bibliographic information from commercial sources. A major organisation specialising in bibliographic services to libraries operates the LYNX Marc Record Service which has in its data base

a significant number of records of nonbook materials, many of which have been obtained from overseas sources. This data base includes the National Union Catalogue of Audiovisual Materials, a union catalogue of some 11,000 items in the collections of the libraries of a number of Australian institutions of tertiary education. Through LYNX, client libraries have access to a significant body of bibliographic information to assist in the location and cataloguing of nonbook materials.

The development of a comprehensive record of all nonbook materials produced in Australia is hindered by the lack of legal deposit requirements for such publications. Under the Australian Copyright Act and various state Acts, a copy of any published work must be deposited with the National Library of Australia and the State Library of the state in which the work was published. This requirement is restricted to printed works and does not include non-print items. Many publishers of nonbook materials, realising the value of having their productions listed in the national bibliographic record, have voluntarily provided the National Library of Australia and appropriate state libraries with copies of their items. Recently the Australian Recording Industry Association agreed to deposit voluntarily in the National Library one copy of all sound recordings released in Australia. The likelihood of legal deposit of nonbook materials becoming a statutory requirement in Australia at the Commonwealth level is not high at this time.

Perhaps the most controversial matter associated with nonbook materials in Australian libraries at present is that of copyright. Under the existing copyright legislation in Australia severe restrictions are placed on the use of nonbook materials for educational purposes. The inadequacy of the present legislation has been widely recognised and led to the Attorney-General of the Commonwealth of Australia inviting interested organisations and persons to make submissions during 1981 in relation to reform of the law. The Copyright

Act of 1968 is the basis for copyright in Australia. Under this Act, virtually all copying of motion pictures, sound and video recordings and recording of radio and television broadcasts is prohibited without the permission of the copyright owner. This severely hampers the availability of nonbook materials to users.

The present law was developed at a time prior to the availability of modern video and audio cassette recorders and certainly does not cater for what has become normal use of sound and video recordings by individuals and educational institutions. The review of the copyright law has been marked by opportunities for all interested parties to contribute their views. It is anticipated that draft legislation will be available for debate during 1983.

The Library Association of Australia, as the major professional organisation representing library interests, has been actively involved in the process of review through the preparation and presentation of submissions and through discussions with officers of the Attorney-General's Department. Certainly that department has been made well aware of the legitimate needs of libraries to provide users with reasonable access to nonbook materials. In its submission the Library Association of Australia[9] has identified changes which are required in the law to meet the reasonable needs of library users while protecting the reasonable interests of copyright owners. The Association recognises that individuals and organisations in whom the copyright of particular nonbook materials is vested have a right to receive a fair and reasonable recompense for copying of their materials. However limitations placed on copying must not be so restrictive as to prevent reasonable access and use for study, research and teaching.

There has been a trend in Australian libraries towards making nonbook materials available on open access to users and in many instances they are incorporated

with book materials in an integrated collection. To assist publishers in the packaging of nonbook materials so that they are suitable for storage in standard library shelving the Library Association of Australia, through its Audiovisual Services Committee, has been preparing guidelines for packaging nonbook materials. In developing these guidelines it has been considerably influenced by the work done in this area by the Council for Educational Technology in the United Kingdom. Through the kind co-operation of Anthony Thompson, the Committee also had access to the manuscript of his paper, Storage, handling and preservation of audiovisual materials,(10) recently published as Booklet No.3 in the "IFLA AV Action in Series". While principally directed towards storage in libraries, Thompson's paper was a valuable resource for the Audiovisual Services Committee. The publication of such practical guides for use by librarians developing collections on nonbook materials is indeed a worthwhile venture by IFLA.

In a relatively new and developing area such as the provision of nonbook materials, librarians are seeking practical guidelines to assist them. Publication by IFLA of documents of that nature would surely be welcomed by librarians. The preparation and publication of a list of persons available to offer advice to librarians developing nonbook collections and related services would, from my experience, also be a useful contribution which IFLA might consider.

In this short paper I have covered a number of continuing issues in the provision of audiovisual information resources in Australian libraries. If pressed to suggest those issues which I consider are of greatest importance I would nominate the development of guidelines for the provision of audiovisual services and collections in libraries, the continued expansion of efforts to bring about national bibliographic control of nonbook materials, and reform of the copyright law to improve access to and enhance the use of nonbook materials for research and study. I am aware that these are issues not only

of importance in Australia, but in many of the countries which are associated with IFLA. Indeed, many were included amongst the issues discussed in the paper "IFLA and audiovisual materials" published in IFLA Journal in 1981.[11] IFLA is providing an important venue for discussions on these matters and for developing practical solutions to the problems inherent in them.

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Division: Education and Research

Section: Round Table on Library History

34 - LIBHI - 2 - E

Library History and the History of Technology: The British Experience.

by

K.W. HUMPHREYS

Birmingham

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LIBRARY HISTORY AND THE HISTORY OF TECHNOLOGY: THE BRITISH EXPERIENCE.

My original brief was to provide a paper on Library History and Technology. I soon found that the scope of the subject was so broad that it would require a book or thesis - possibly even a book for each country - to deal satisfactorily with it. I was therefore constrained to impose limits and decided to give a brief survey of the British scene. One advantage is, I believe, that I am much more conversant with the situation in my own country than that of others for which I should have had to seek information only in published sources.

I should like to emphasize the fact that this is not intended as a 'How we do it well in our country'. Many of you will be well aware that a number of technological advances made in the United States and Europe became common property and were developed universally. In these circumstances I make no claim for British primacy in anything that follows here.

The establishment and rapid growth of libraries specifically for the study of and research into technology dates only from very modern times, generally speaking from the second half of the nineteenth century, and this is true for most of the countries of Europe. We cannot however leave a vacuum for the earlier period.

The development of technology in the Middle Ages was slow and limited to a few aspects. Mining and metallurgy for example remained largely dependent on classical authors, although the iron and steel industries became increasingly important for agriculture implements, armour and household utensils. There were few books on the subject - Vitruvius on quarrying and mining and Albert the Great on metallurgy were two popular texts. The former was found in many Benedictine monasteries throughout Europe from the ninth century onwards, probably more for the architectural content of his book. Albert the Great, a thirteenth century author whose knowledge of metallurgy was superficial, wrote mainly on theological and philosophical themes so that his De mineralibus is probably present in the libraries of the friars and in universities because of his reputation rather than for the practical value of his book. Other texts commonly present in early medieval libraries which were useful for the monks were Palladius on agriculture and Vegetius on the martial arts. Scientific studies were carried on at Oxford and elsewhere by Roger Bacon and others in the later Middle Ages, but the only technological advances were made in the field of applied chemistry aided by the attraction of alchemy. The study of astronomy and the use of the astrolabe had practical implications for sea-faring. Astrology was closely associated with these studies and became so respectable that professors taught the subject at some Italian universities. It is not therefore surprising to find many translations from Arabic and Greek texts on these subjects in the scholarly libraries of the day in universities and even in religious houses.

At this date however there is a gulf between the practitioners and the theoreticians and I can find no evidence that libraries played any part in bringing them together, although some historians of science suggest that many theoretical scientists had an interest in practical results of technical innovations(1). The importance of medieval libraries was to preserve for posterity texts of all kinds, including the few of technological interest.

The dissolution of religious houses occurred much earlier in Britain than in other European countries. By the middle of the sixteenth century the only ecclesiastical libraries of any size remaining were at the cathedrals of Durham, Hereford and Worcester. The books from monasteries were largely destroyed, and those which survived usually owed their existence to private collectors and later, to some extent, to the only other major library collections at Oxford and Cambridge and to the Royal Library. In these circumstances access to books was restricted to a small number of people, few of whom would, themselves, be interested in technology and even if they owned any books on the subject they would not make them available to those who might be in need of them. Scientific works were fairly popular among collectors 'Materials for the history of Science were particularly full in [English Renaissance] catalogues ... Scientific works are commonly divided into medicine, cosmology, geography and other subjects(2). The 'other subjects' rarely include applied science except perhaps alchemy. The 200 books which belonged to the famous astrologer and alchemist, Dr. John Dee, in 1583, had a good representation of alchemy, astrology, astronomy, physics,

geometry, optics and mathematics, mainly by medieval authors, but very few titles indicate an interest in technology; the nearest are, perhaps, Philo of Byzantium De aquaeductibus, tracts on the use of the astrolabe, Roger Bacon De utilitate scientiarum artis experimentalis and in the 1556 list, the Modus fabricae materialis speculi comburentis (3). I can find little else in the lists of the books in private libraries of the period or in the libraries of institutions. In any case there would seem to be no opportunities for those engaged in technological industries to have access to the somewhat sparse literature on the subject or indeed to any other books.

The first establishment of libraries of some size, independent of universities, cathedrals, colleges and schools, comes in the great period at the end of the sixteenth century. A number of endowed libraries were founded, usually the result of a generous gift by a benefactor to a church or in some cases to a town. The earliest which was intended to be available to the public was founded at Grantham in October 1598 by Francis Trigge, rector of Welbourn (Lincs). It was seen by Trigge as serving a general educational function and he wished it to be made use of by 'such of the cleargie and others as well being inhabitants in or near Grantham ...'(4). Many similar libraries were established in the seventeenth century, in larger towns until about 1680 and in small towns and parishes after that date. Usually they were instituted specifically for the use of the clergy, but a number were, at least in theory, of use to others. It would seem that although the majority of the books provided were theological, mostly in Latin, they were sought after by the non-clerics(5).

The libraries continued to be set up during the eighteenth century, generally with a specifically religious bias, but the donors of books could impose their own interests on the contents of a library. Dr. Charles Aldrich bequeathed his library in 1737 to the parish of Henley-on-Thames representing not only theology and the classics but works of general literature, history, topography, travel and natural science. Such a collection was not particularly unusual, but Aldrich's library also contained books on mathematics, astronomy, medicine, agriculture, philosophy, education, poetry and the fine arts(6). Such collections might have been of use to those interested in technical subjects but are regrettably very unusual and were probably not seen by ordinary readers. Some parish libraries which began with gifts, bequests and even endowments were unable to continue in their original form and became subscription libraries, i.e. books were made available to those members of the public prepared to pay a sum yearly or even weekly for the privilege. Some outstanding libraries began in this way in the large towns, often with foundation or proprietary members. These were the gentlemen's subscription libraries in which Joseph Priestley played an active rôle at Warrington (1763-67), Leeds (1768-72) and Birmingham (1780-91). The membership consisted of representatives of the church, law and medicine but a number were concerned with industry. The committee of Birmingham Library, elected in 1791, included two button-makers, a manufacturer of fire-arms, a manufacturing chemist, a buckle-maker, a merchant, three manufacturers and a metal merchant(7).

Yet despite the technical interests of members the libraries did not stock technical literature. Their policy, generally, was to exclude professional material.

At Birmingham (and also at Leeds) in 1784 there was a move to establish a separate section of the Library for science. Members were encouraged to donate books and to pay a special subscription for the purchase of 'Scientifical Books' and 'especially Foreign Publications of that class'. Nothing further is known of this collection after 1799 and it is not possible to determine whether the books were purely scientific or whether they covered any aspects of technology(8). In general it seems unlikely that these subscription libraries made any significant contribution to the spread of technical knowledge. The records of loans from the Bristol Library Society are virtually complete from 1773 to 1857. Some scientific items were borrowed but little in applied science apart from experimental works of Joseph Priestley whose works were well represented in the Library(9).

The gentlemen's subscription libraries of England had been preceded in Scotland by libraries for artisans, of which the best known was that established by the miners of Leadhill (Lanarkshire) in 1741. The list of members survives from 15th April 1743 to 1902 and a catalogue was printed in 1904. There are few scientific works recorded from the early years, the most relevant to our purpose being A Collection of Scarce and Valuable Treatises upon Metals, Mines, etc. Apart from that and Robert Jameson's System of Mineralogy the Library would appear to be recreational and educational in its purpose(10).

Another Scottish library founded 'for the benefit and encouragement of young students in 1694 by David Drummond, Lord Madertie' was an endowed, not a subscription library. Books could be borrowed and lists of loans for 1747 to 1800 have survived. The crafts of the users included e.g. cooper, dyer, flaxdresser, glover, merchant, miller, quarrier, shoemaker, smith, tailor, watchmaker, weaver and wright. The books they borrowed were not relevant to their work with the possible exception of the Philosophical Transactions which occasionally published articles on applied science(11).

Towards the end of the century a new institution was founded in Glasgow which had two important results. It established an idea of a centre for teaching industrial arts and, by accident, led to the setting up of Mechanics Institutes. John Anderson, Professor of Natural Philosophy in the University of Glasgow, in his Will, laid down the details for the establishment of an Institute which from 1796 to 1828 bore his name. It would have four Colleges - Arts, Medicine, Law and Theology but 'The chief design of this Institution is to afford young Gentlemen intended for the Arts, Manufactures or Commerce, an opportunity of acquiring such a portion of useful knowledge as will qualify them for the society to which their fortunes insure their admission(12). Of the 2.000 volumes bequeathed by Anderson to his Institute only 19 were concerned with the Mechanical Arts and there was considerable disenchantment with the quality of library service available in this area leading to a secession of the Mechanics Class in 1823 to a newly formed Glasgow Mechanics Institute.

Unfortunately the finances were inadequate for carrying out Anderson's ambitious plan and the institution became a technical college. The first Professor of Natural Philosophy, Thomas Garnett, said that the Institute was 'well adapted to promote useful Knowledge and Improvement in Science and Philosophy applied to the various branches of Trade and Manufacturers carried on in this City and neighbourhood[13]. His successor was George Birkbeck (the founder of Birkbeck College in the University of London) to whom the Mechanics went for advice for their new Institute. In the same year Birkbeck was elected Chairman of the proposed Mechanics' Institute of London which was sponsored by respectable and influential middle-class figures, and was not financed nor controlled by working-class people. The library, made up of gifts of largely useless scientific books, was not an immediate attraction. The same may well have been true of other Institutes which began to appear in all large towns - some 100 by 1835 and perhaps 600 or more by 1850 when they had spread throughout the country. The Society for the Diffusion of Useful Knowledge issued A Manual for Mechanics' Institutes in 1839 with an appendix listing about 500 book titles and authors proposed for their libraries. These are still not professional collections but mainly recreational as the number of volumes of 'useful arts' was comparatively small. Nonetheless the artisan or mechanic looking for technical information would be more likely to find it in a Mechanics' Institute than in the small number of libraries otherwise available to him. They later often formed the nuclei of public libraries or technical college libraries, or found their way into university libraries[14].

The later history of the provision of technical literature must be traced in the development of national collections, the libraries of Societies, Institutions and Associations, Departments of Government, Universities, Colleges of Technology and industrial firms and in large public libraries.

Until it was incorporated into the British Library, the British Museum Library, formed from the Royal Library and other collections in 1753, was an encyclopaedic collection although its emphasis was earlier on the humanities. In the twentieth century its interests were developed more widely and it had built up a strong coverage not only of British publications (obtained by legal deposit) but also of foreign scientific and technical literature. The more recent materials were added to the library of the Patent Office, which had been founded in 1852, to form the National Reference Library of Science and Invention within the structure of the newly constituted British Library in the British Library Act 1973.

In 1843 Sir Henry de la Beche presented his scientific books to the nation. These, together with the Education Library of South Kensington Museum (formed in 1857) and the books from the Museum of Practical Geology were amalgamated in 1883 as the Science Museum Library. It was open to the public and was a lending library for scientific and technical literature.

The centre for loans, the National Central Library, was founded by Dr. Albert Mansbridge in 1916 and was then called the Central Library for Students, intended mainly for

those who could not obtain their texts from public or university libraries. After the creation of County Libraries in 1919 its purpose was changed to supplementary library services, relying on the collections of other libraries recorded in a union catalogue. In later years it began to acquire its own bookstock. Although its services in humanities for loans and photocopies from libraries both at home and abroad were adequate its coverage of technical literature was very sparse, depending largely on the Science Museum Library collections.

In 1954 the Advisory Council on Scientific Policy recommended that a new national science lending library should be created. This library would take over from the Science Museum Library the responsibility for providing a national loan service in science and technology. In 1957 a planning unit of the Department of Scientific and Industrial Research was set up to build the library. By 1962 sufficient literature had been collected, together with a large section of the Science Museum, to enable the National Lending Library for Science and Technology to assume full responsibility for the provision of loans and photcopies mainly from its own stock.

The National Central Library and the National Lending Library for Science and Technology were united on the establishment of the British Library as its Lending Division.

A great many specialised libraries participate with the Lending Division in the supply of material not available in its stock. These include some of the important technical societies and institutions. Groups of scientists and

technologists formed themselves into societies to provide a forum for the discussion, and often publication, of their research activities. The earliest British organization of this kind was the Royal Society which originated in meetings of scientists in 1645 but held regular meetings from 1660 when its library was begun. Publication of its Philosophical Transactions dates from 6th March 1665. The library now houses more than 150.000 volumes with a rich collection of manuscripts and letters of outstanding pure and applied scientists. A similar library belongs to the Royal Institution founded by Benjamin Thompson, Count Romford, in 1799(15). Its purpose was to conduct research and to give lectures in scientific and technical fields.

The libraries of government Departments have also contributed to the national stock of books and periodicals. The earliest, like the India Office founded in 1802 by the East India Company, were not specifically technical although Indian technical publications were made available through the India Office as it was legally entitled to all material printed in India, including Burma. The more technical Departmental libraries did not come into existence until the twentieth century,e.g. the Ministries of Transport in 1920, Power in 1942 and Aviation in 1959.

The learned societies we have already referred to were, and still are, associations of people with common interests but not necessarily members of a profession of holders of particular professional qualifications. The professional

societies, on the other hand, have members of a profession who qualify by passing examinations organized by the society. The latter type therefore soon built up collections of material for research for the qualified and texts for students. The earliest was the Institute of Civil Engineers founded in 1818, followed by the Institute of Mechanical Engineers in 1847, the Iron and Steel Institute in 1869 (now joined with the Institute of Metals), the Institute of Electrical Engineers in 1871, the Institute of Mining Engineers in 1889 and the Institute of Mining and Metallurgy in 1892. They have had a very considerable influence on the quality of engineers and through their libraries have provided opportunities for study and research of a high standard. The library of the Iron and Steel Institute may perhaps be taken as an example of this type of organization. The library was established twelve years after the beginning of the Institute when the Reception Committee had £112 at its disposal and decided to allocate it to a fund for the provision of a library. This was augmented by a gift from Lady Siemens of her late husband's metallurgical works, and together with the books and periodicals accumulated over the past twelve years a library was formed. In 1884 the first printed catalogue was issued and until 1908 successive secretaries of the Institute acted as librarian. In 1908 Richard Elsdon was appointed librarian and as a result the service was greatly improved. Until 1914 the collection was available to members for reference only. Loan facilities were extended to all members in 1919. A Technical Information Bureau was then established and reorganized as an Information Department in 1935. The staff grew to 15 persons by 1965[16]. I have given this library's brief history as it typifies the general

development of services in many organizations of this type - the slow rate of growth at the beginning under a non-librarian, the great improvements made under a full-time librarian and the change-over from reference to lending facilities followed by the establishment of more sophisticated services.

The first legislative enactment dealing with technical education in England is the Technical Instruction Act of 1889. It provided that 'The expression "technical instruction" should mean instruction in the principles of science and art applicable to industries and in the application of special branches of science and art to specific industries or employments'. By the Act local authorities were enabled to provide technical instruction for the working classes from the rates at one penny in the pound. Authorities were originally slow to act but were encouraged by the accidental provision of money under the terms of the Local Taxation Act 1890. By this Act certain monies, unappropriated from the residue of beer and spirit duty, were made available for the purposes of technical education. As a result not only was the curriculum of elementary schools widened to encompass technical subjects but, more significant for our present purpose, at least twelve technical institutions in London and thirteen in the provinces were established under this scheme.

The Royal Polytechnic Institute had been founded by Sir George Cayley, one of the pioneers of aviation, in 1838 for research work and the teaching of engineering and science. The Royal Charter was granted in 1839. When Quintin Hogg began work for youth in 1865 he named his Institution a

Polytechnic on analogy with the Royal Polytechnic and later Polytechnics owe their inception to him. The effect of the 1889 and 1890 Acts can be seen in the rapid growth of these institutions in London from 1891 when the Woolwich Polytechnic was founded with Borough in 1892, Battersea in 1894, Chelsea in 1895 and Northern and Northampton in 1896. Their purpose was mainly the teaching of technical subjects, but research was not catered for. As a result their libraries were geared towards the provision of students' reading materials. The polytechnics or technical colleges were designated Colleges of Advanced Technology in the White Paper (Cmd 9703) on Technical Education in 1956. It was stated that 'every technical college should have a library with an adequate supply of technical books and journals ... and should have a grant large enough to enable its acquisition of books and periodicals to keep pace with technical developments'. In 1963 the Robbins Report which dealt with the future of higher education in Britain removed the Colleges of Advanced Technology from the jurisdiction of the local authority and gave them the status of technical universities. While Colleges of Technology have continued to offer library services of a high standard their level has remained instructional and the technological universities have become centres of research.

Government participation in, and support for research on a substantial scale started as a result of the First World War and the deprivation of supplies of essential material ... Research at the beginning of the 20th century was considered generally as a matter of no great significance and it was an activity that could well be left to the Germans'(17).

Britain was therefore unprepared for undertaking research itself as the government had not understood and therefore not encouraged the development of applied science and no official machinery existed to co-ordinate action. In 1916 Viscount Haldane, after a strenuous campaign, managed to bring about the formation of the Department of Scientific and Industrial Research. In its first report it said 'It is not often in our history that the nation has had time to think. Now by a curious paradox, while the flower of her youth and strength are fighting for her freedom and her life, the others have a chance of thinking out the best use to which that life and freedom can be put ...'[18] The DSIR's aims were firstly to encourage and stimulate industrial research and secondly to support research establishments in areas of national interest like the National Physics Laboratory. Finally it would create co-operative research associations, autonomous bodies controlled and organized by the industries for whose benefit they existed[19].

By 1930 DSIR had started eight laboratories and taken over several research stations - the National Physical Laboratory (which had been set up in 1900) in 1918, the Fuel Research Station, no longer in existence, in 1917 and the Geological Survey, which had begun as early as 1835, in 1919. Each organization has its own library and there is a headquarters library in London.

Other establishments covering broad areas of research of national interest with important library and information services came into existence after the Second World War, such as the Central Electricity Generating Board in 1958 or the

Gas Council in 1949. The latter's Basic Research Group set up in 1962 established research stations with specialised libraries to support their activities. The most important, from a library point of view, of these undertakings is the United Kingdom Atomic Energy Authority which began in 1946 with the creation of the Division of Atomic Energy of the Ministry of Supply, and the Authority emerged as a public board in July 1954. The five largely autonomous 'Groups' are free to manage their Library and Information Services as they wish although some co-operation is possible through the AEA Library and Information Services Co-ordinating Committee. Over the years many Divisional or Sectional Libraries have been set up and sub-libraries have come into existence where buildings are spread widely over a site. The largest collection is at Harwell.

As we have seen above one of the aims of the Advisory Council for Scientific and Industrial Research from its establishment in 1915 was the creation of co-operative research associations to meet the pressing needs of various sections of industry. The scheme proposed 'was designed to meet the individualistic outlook of British industry which, with the notable exceptions of the electrical and scientific instruments industries, placed little premium on scientific investigation and were still wedded to the tradition of trade secrecy. Industry also made a clear distinction between pure and applied research and it had to be shown that money spent on applied research undertaken in co-operation with competing firms could produce profitable results'(20).

Since the scheme started in 1918 the number of associations has increased to about 50, serving industries

which represent more than half the manufacturing output of Britain. Library and information services of course are fundamental to research, and expenditure on such services represents between 8 and 15% of the total sum spent. They provide access to as full a coverage as possible of the associations' immediate fields of interest in books, periodicals, abstracts and unpublished reports. Although the service is primarily for staff and association members most are prepared to lend their material to other libraries and to answer technical enquiries. The subjects covered by these associations include Non-Ferrous Metals, Electrical and Allied Industries, Motor Industry and Production Engineering.

In addition to the libraries of research associations there are collections of library materials and information services in connexion with some Development Associations such as the Copper Development Association formed in 1933, when its library was started. Further, there are Trade Associations to assist manufacturers in all aspects of their legal, commercial and trading interests. Many offer good information services but their libraries are not as well developed as those of research associations. However, they provide access to commercial and technical literature not otherwise generally available.

The source of much commercial and industrial information has been the literature provided by firms. Although some industries began developing research units, often with libraries, in the period between the two World Wars the really significant increase took place after 1945. Expenditure by British industry on research and development, which was only £5.5 million in 1939, had increased to £30 million in 1951. In

1958 it reached about £300 million and by 1962 it was approximately £400 million. Libraries were included in this expenditure and their rapid growth is mirrored by the rise in research costs. Yet it is unfortunately true that only the large firms built up substantial libraries employing qualified staff. As only 2% of companies in Britain employed more than 1,000 people it is evident that small industries employed the majority of workers and they could not, or did not think it necessary to, employ research staff. The Ministry of Technology therefore established Regional Centres, beginning in 1964, to assist the small firm with advisers in technical departments of colleges or universities who could depend on the library resources of their parent institutions.

The large firms, e.g. Imperial Chemical Industries, Associated Electrical Engineering and Tube Investments, had a number of Divisional Libraries and smaller subsidiary collections offering information services to several thousand professional, technical and scientific employees. They usually lent their material and provided information to libraries outside the Company(21).

So far we have been concerned with libraries which were mainly founded to support teaching or research of a specifically technical nature. There are two other groups of collections of technical literature, i.e. in university and public libraries, although this is only one aspect of their activities. Nonetheless, especially in the past 30 years, their stocks of books and periodicals, reports, patents etc., represent a significant contribution to the national resource.

18(22)

In the second half of the nineteenth century the enthusiasm for increased access by the general public to education and to self-instruction found some satisfaction in the Public Library Act of 1850 and the first Education Act of 1870. In the centres of population outside London, which of course were also the centres of industry, there was a desire for the opportunity for university education for those who could not get to Oxford or Cambridge. Owen's College, Manchester, was founded in 1851 and similar Colleges in Liverpool, Leeds, Sheffield and Birmingham came into existence in the next 30 years. Their emphasis from the first was on science to which Engineering was soon added. By the beginning of the twentieth century they had all attained independent university status. Their Libraries grew only very slowly and their applied sciences collections were not very significant until the 1950's when extra finance was made available by the government through the University Grants Committee. Since that time ten Colleges of Advanced Technology became Universities and their libraries rapidly expanded so that technical literature and information services manned by qualified staff in universities are a not inconsiderable part of the available store of material for technological research. It may be objected that I have made no mention of Imperial College of Science and Technology in the University of London since it would seem by its title to be relevant to this paper. I must point out that as it is housed next to the Science Museum Library it has not appeared necessary to build up a large central library of its own and has developed a number of departmental libraries.

The Public Libraries Act of 1850 did not result in an immediate flourishing of municipal libraries, but gradually

they spread throughout the country during the second half of the nineteenth century. The needs of industry were not recognised before the First World War, although the Library Association in 1903 had advocated the provision of technical books in public libraries with financial help from the government. It was revived again in 1916 by the Association and its proposal in 1919 was that the government should make grants to libraries in the centre of large industrial population areas for the setting up of technical libraries linked with smaller technical libraries in the region and drawing on a national technical collection, also supported by a grant. In the event it was left to local authorities to take the initiative. Glasgow established the first commercial library in 1916, which was followed by Liverpool in 1917 and in the next few years by Leeds, Manchester, Birmingham, Edinburgh, Bristol, Sheffield, Hull, Bradford and Coventry. Some libraries separated their commercial and technical libraries; Manchester, for example, set up a commercial library in 1919 and opened a technical library in 1922; Birmingham also started the commercial library in 1919 but did not create the technical library until 1924. Each centre attempted to provide literature and information to small firms covering every industry carried on in the Region. This resulted in a network of technical library services in all the industrial regions of Britain.

To sum up, in the Middle Ages technology made considerable advances at the practical and theoretical levels, but libraries reflected only the latter, derived mainly from classical sources in the earlier period and from translations from Arabic works and from genuine experimental work in the later

years. Although advances continued during the following centuries there is little evidence that libraries collected material of a technical nature.

The industrial revolution made demands on artisans for better education and training. They either provided the means for bettering their understanding by forming libraries for themselves, as at Leadhills, or accepted without too much enthusiasm the facilities offered to them by the middle classes, as in the Mechanics' Institute. Here, as well as in the subscription libraries, where employers, rather than employees, were members, very little attention is paid to technical books.

The formation of associations of applied scientists in the earlier nineteenth century, with relevant library collections, was followed by the surge of philanthropic spirit tempered by an appreciation of the needs of industry which resulted in the Public Libraries Act, the Technical Instruction Act and the founding of Science and Technical Colleges. Provisions of technical literature at the end of the century was mainly aimed at teaching rather than research. Some evidence of a desire for the government to accept responsibility for industrial research and for funding appropriate library provision in the early years of the twentieth century can be found in the activities of the Library Association. It was not until the First World War that the country's shortcomings in industrial research were revealed. From that period technical libraries began to be established and developed

between the Wars, but only slowly as funds were not plentiful. The Second World War gave a further impetus to the sponsorship of research in industry and in universities and colleges. Co-operation and even co-ordination of resources were encouraged so that the libraries of firms were available through inter-library loans to other users, and in public libraries technical and/or commercial libraries acted as centres for the exchange of information. Universities and colleges were in receipt of funds adequate to build up excellent collections of books and periodicals on technical subjects. At the national level the National Reference Library of Science and Invention and the Lending Division of the British Library were well financed to offer a service for technologists and industrialists of the highest standard.

I conclude at a peak of library provision, leaving others to chronicle the downhill path which has followed with even the larger firms reducing their research potential and closing their libraries, with universities and colleges, as well as public libraries, finding it necessary to cut staff and purchases of books and periodicals, and with even national libraries being required to accept some retrenchment.

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The Development of an International On-line Legal Information Service and its Cooperation with Similar Services.

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EUROLEX

THE DEVELOPMENT OF AN INTERNATIONAL ON LINE LEGAL INFORMATION RETRIEVAL SERVICE AND ITS COOPERATION WITH SIMILAR SERVICES.

The creation of any on-line retrieval service is a complex and expensive undertaking. When that service is aimed at the legal market then added difficulties arise because of the conservative, cautious nature of the profession which sees itself as the custodian of the highest values of probity and integrity in national life. If a further requirement is that the service concerned must include the development of international and transnational law, such as that of the European Community, then the project is undoubtedly ambitious. The EUROLEX service was set these objectives and this paper will describe what has been achieved, some of the problems encountered, and what remains to be done.

The current situation is that EUROLEX has over 320 subscribing organisations which access the database of over 1,500 million characters of legal text, via more than 400 remote terminals. I would point out that this is a fully commercial venture so the price charged has to be right as well as the technical quality if the needs of paying customers are to be satisfied.

The initial objectives which the service was designed to reach were:-

1) The provision of a high quality, comprehensive database in full text.

2) The use of a simple easily understood retrieval language for the non-technical user.

3) The use of general purpose terminals to access the system via the public telephone service.

These simple objectives were progressively added to by a process of iteration in which every member of the EUROLEX team assisted and in which the users of the service played a significant part. As a result these objectives developed into a philosophy of approach which includes the following ideas:-

4) That a genuinely independant user group has an important role in the development of the project. The users are involved.

5) That many forms of access to the system should be allowed e.g. intermediate users or user clubs, and that a wide variety in the pattern of usage should be expected and encouraged. The librarian has a particularly important role here.

6) That the users required a variety of data including, digests and secondary materials such as encyclopedias, textbooks etc.

7) To add value to the original data by editorial enhancements and by the propinquity of a variety of data. Quite simple additions can assist the search process.

8) To provide for access to the system via the publicly developed telecommunications packet switching networks, both national and international. This has assumed increasing importance as the project has progressed.

9) To keep in mind that users would want access to other computerised services, eg World Reporter service of the BBC.

10 To have a genuinely international outlook and to co operate with similar services in other countries.

11 To be flexible in our approach, to experiment and to be willing to learn from experience.

We have tried hard to measure up to this philosophy and with some degree of success but we are never content and never satisfied with what we have done. The achievement of one goal simply clears the way for the next.

Let us now describe how we set about reaching these objectives.

2. Laying the Foundation - The Initial Phase

One of the problems of setting up a legal service is the lawyers themselves. What do they really want? Do they know what they want? Will they tell you even if they do know? The legal profession, because of its personal responsibilities to its clients, has a marked reluctance to reveal its methods of work and, in particular how it uses information.

The only way to proceed is to match their professional standards of integrity and service with the same qualities from the total computer service, not only in its technical aspects but also the people who are involved in it from data preparation through to the field sales force. One of the reasons for the success of EUROLEX has been the manner in which the trust and confidence of the legal profession in the U.K. has been won. This is largely due to the dedication and commitment shown by all members of the EUROLEX team. The sum of the whole is much greater than the sum of the parts.

But of course the starting point has to be in the data on offer. It is not possible to begin with a comprehensive database, a start has to be made with less. The first choice was for a few primary legal sources of known standing in the profession. Integrity of the database is vital. The three first libraries were:-

1. Common Market Law Reports - the full text of European Community case law.

2. Fleet Street Reports of Patent Cases - the full text of important British, Commonwealth and European cases on intellectual property.

3. The Weekly Law Reports - the full text of official UK case reports.

In the first instance only 10 years of these definitive reports were stored though this was rapidly increased to 20 years. One other database was added to these three - The Times Newspaper Law Reports from 1977. This is a library of reports which appear in the Times Newspaper soon after the decision of a case, normally within 48 hours. This is a legal current awareness service.

These four databases were made available to a number of pilot users and from their usage many valuable lessons were learnt. On the software side the retrieval performance of the STATUS software package was assessed and significantly improved. The essential control and organisation required for large scale database building was developed. The matching of the legal structure to the software structure was evaluated and understood so that, for example the structure arrived at for case law is still used. Many technical components were tested and tried in this period. In particular the need for reliability as perceived by the end user was identified as a major factor in a successful service. This is by no means the same as reliability as seen from the point of view of the computer systems centre. The lawyer in a provincial office accessing via a dial up terminal regards the total system, including the communications as one.

Much was learnt about user behaviour. The usage of Times Law reports showed the need for more than primary sources of law to be stored and pointed the way to the need to lead the user into primary libraries by means of secondary sources. The Times Law Reports databases has shown that lawyers make good use of a current awareness service.

This led us into extending the database from basic primary reports to abstract and digest materials, legal news, and encyclopedias covering specialist topics in law. Comprehensiveness is not simply a matter of size.

One further point about user behaviour, important in a common law legal system, is that it is the most recent 5 to 10 years of case law that is used. In the U.K there is always an opinion which says that precedent must go back to at least the late 1800's in order to be complete. For certain leading cases this may be so but they are well covered in the text books. Much time and money could be spent in building a database back to, say, 1850 but the reality of a commercial service is that a 30 year extent in the database is generally sufficient, though there may be exceptions in certain specialist subjects. Thus is our U.K. database the cases go back to the 1945 - 1950 period and no further.

This early period was invaluable in deciding on the structure and extent of the database, in improving the software, particularly the user inteface, in developing the telecommunications links, and in enhancing the total computer systems in terms of reliability and response.

The next step was to go out into the market place and gauge the response to our product.

Concurrently with the pilot phase the database was being built up with the addition of other libraries to widen the appeal of the service. At the same time, the field sales force began and then continued to make a direct approach to prospective customers and testing their reaction to what was on offer. This was mainly done by demonstrations in the offices of prospective customers by seminars, lectures, direct mail and so on. One of the prime objectives of these activities was to educate the profession in the use of this new technology.

At the same time these processes provided feedback and basic market research. At first EUROLEX had an initial subscription but this was eliminated in favour of a straight usage charge based on connect time alone. Again many prospective clients were waiting for particular data to be on the database so this period set the priorities in data loading.

It may be said that this initial phase, which lasted 18 months provided the experience on which to base the commercial decisions for the large scale development of the system. This learning curve cannot be avoided and was necessary in order to educate EUROLEX in the realities of the market place and the profession in this new technology.

We will now show how the lessons learnt have been implemented in the current service.

3. The Current Situation

In September 1981 EUROLEX had 25 customer organisations accessing a database of about 300 million source characters. Now 2 years later, there are over 300 customers accessing over 1500 million source characters. A period of rapid expansion in which the lessons learnt in the early phases, have been applied with some success.

The legal profession in Britain is not homogeneous but has within it specialist market segments. About 60% of the database covers the general of British law both case law and statutory materials. The EUROLEX database was strong in two areas - Patent Law and European Community Law. Both of these areas have been expanded and strengthended, and both these sectors have important international connections which have led us into cooperation with other national centres, such as, ITALGUIRE, SYDONI, EURIS in Europe and WESTLAW in North America.

A third specialist area arises from the existence within the British Isles of several smaller jurisdictions in addition to the main one for England and Wales. Most notable of these is Scotland and Scots Law with its links with Roman Law. The Scottish database on EUROLEX has been a great success in supplying a needed service to a numerically small legal fraternity for whom traditional legal publishing was barely economic.

While most of the use this particular library is by the Scots themselves there is a surprising interest in it outside Scotland. Large multinational companies access this file, so do academic lawyers and so, occasionally, do European. Thus there is a diversity of interest and EUROLEX has responded by building a catholic database of some 20 distinct complete libraries each of which has its own individual character. Thus the user can choose the library of interest to him or indeed familiarity, and know its style, structure and language and be sure that this is faithfully recorded. The searches made are to the point and do not generate undue noise or run up the heavy costs of searching large conglomerate databases. A further important advantage is that the copyright of any particular publisher's data is clearly delineated.

This methodology has revealed interesting usage patterns and user profiles which have been of value in planning for expansion. There are certain convergences of interest which have led us to merge certain of the libraries to suit user demands. Again the macro facility in the STATUS software has now been further developed in a way which will make the macro facility one of the most powerful tools in the system. The full impact of this will not be felt by users until early in 1984. The expansion of the total database has been based on this experience.

Existing libraries, such as Weekly Law Reports, have been completed back to their date of inception. New libraries covering such topics as road traffic, planning and environmental law have been added or are in an advanced stage of preparation. Other libraries such as those on employment law have been expanded with the addition of complementary materials.

In order to carry out this expansion EUROLEX has become a complete database provider. A group of skilled database builders has been assembled who have proved able to meet any challenge given to them. Raw data comes to EUROLEX in a variety of forms and formats from friendly magnetic tape to unsympathetic floppy discs. Much of the data, particularly backlog material has to be re-keyed but an increasing proportion is derived from printer's computer typsetting which is the proper way to prepare data. Not that this is a panacea, since British printers are notoriously individualistic and there are no common standards, so an intermediate state called EUROLANG has been devised into which all incoming computer typset materials are translated. The final step of conversion into STATUS format is then done by a single program.

All this activity is centred around a VAX 11/750 installation which is currently handling a throughput of over 50 million characters a month. Programs and utilities have been devised for dealing with source data which is diverse in content, characters and medium.

In this way EUROLEX has geared up to an accelerated data loading program which will double the database this year.

4. International Cooperation

While the main thrust has been in the home market EUROLEX has always had an international dimension. Our name and the fact that one of our first searchable libraries covered European Case law shows our connection with Europe, so, naturally, we looked to Europe. All On Line services are based on high quality, reliable and relatively inexpensive data networks such as the U.S.A. has enjoyed for years. When EUROLEX began, this facility did not exist in Europe so access was by either direct dial up or a private network with a node in Rotterdam. A few, but highly valued, users in Holland and Belgium came on to the system and proved that the retrieval language was acceptable and that the EUROLEX databases, in the English language, were of interest.

As soon as possible EUROLEX was connected to EURONET which proved that the public data network was a satisfactory means of communication and that the cost to the user was reasonable. The various national packet switching systems have now absorbed the functions of EURONET and given Europe what it so badly needed. The additional connection to the international packet switching system (IPSS) has now made EUROLEX available to the world at large.

As a result our customer base in Europe has expanded at a steady rate and there are now few users coming in from Australia, Hong Kong and North America. One last point about the networks and that is that the heavy protocols required are difficult for the end user so it has been necessary to move into intelligent terminals and modems in order to make access easier. The busy lawyer cannot be expected to type in 14 digit identifiers, nor should he, his attention must be focussed on his legal problem. PTT's must not assume that only technicians use the networks.

All this acitivity has led us into developing our contacts with other legal retrieval services in Europe. These have been most cordial and have led us into cooperative agreements with several centres. A similar development has been the EUROLEX agreement with WESTLAW in the U.S.A. The distinguishing feature of legal databases in that they are large and never get smaller so it is impossible for any one service to provide all the data required.

Thus legal databases are complementary and need to communicate with each other. There is now the beginning of a legal information retrieval network which will map on to the public national and international telecommunications networks. This is a most important development which has implications far greater than the basic technical facility. There is a great need for further development here. The objective must be to make international access to a database as easy for the end user as an ordinary international telephone call. This is technically feasible but the European computing industry has lagged in the supply of equipiment and software - or if it is available it is too expensive. This goal is an essential part of the move towards a genuine free trade area in Europe comparable with the USA.

5. Commercial Development

The technical development of EUROLEX was matched by equal efforts in the fields of marketing and sales. EUROLEX is a market driven system. Much has been learnt about the complex nature of the legal market place.

An attempt will now be made to answer some practical questions concerning the design and structuring of legal databases, both national and international. While the experiences of others may well differ from ours, the work of recent years at EUROLEX on one of the few databases in Europe to contain a wide range of international legal materials has convinced us that special design factors apply where the market need crosses frontiers between common law systems and civil law codes, between international law as applied internationally and nationally, and between the requirements of legal practioners in private practice and in commercial corporations and governments.

European Law Centre Limited, who prepare and market the EUROLEX service, have been actively publishing European Law reports since 1962. When the company began to experiment with trial versions of the EUROLEX database in 1979, many of the initial considerations about the structuring of materials upon a computer-assisted legal information retrieval service were fundamentally similar to the editorial concerns of the printed law reporting service. Within Europe they had defined a market for legal information which could be categorized by type of users and by style of usage. Most of the company's product was in English. The issue of language was not faced or resolved. An analysis of the type of usage of printed texts made for example by a Dutch private legal practioner as compared to the institutions of the EEC or national governments was fundamental, as was the style of information requirements, ranging from abstracts of cases and laws in the European Law Digest to full text of headnoted cases in the Common Market Law Reports.

While this style of analysis is identical in print or database marketing, the construction of an on-line service created some totally new problems. A subscriber to a printed journal receives and stores both the information he required and also much that he does not need, or which he does not anticipate needing until some future date. A database however provides information on demand, and its efficientcy is measured by its ability to deliver no more and no less than the data required to answer the user's current query. Database design had to address itself to this question, and also to the question of how far users, having satisfied an enquiry at one level. might be tempted by the sheer availabilty of information to push their enquiry to greater depth. Might value added services within the database provide the answer to deepening research and encourage greater usage?

EUROLEX is a young service, having launched its initial marketing campaign at the end of 1980 and having only now completed loading about on-half of its eventual basic library collection. Current loading work envisages a database size in terms of source data of some 3,000 mb by early 1985. In seeking an international market in European Law its first concern had to be the primacy of each national jurisdiction. Most lawyers are most concerned with domestic legal issues: when they move outside of their own jurisdiction they tend to do so through a practioner in the other jurisdiction concerned. The interest shown by a practioner in one jurisdiction concerning the law within another jurisdiction will therefore be different in terms of information from the needs that he has of a database serving his own jurisdiction.

Typically he will want information which will help him to give first level background treatment to enquiries; which will enable him to frame more precisely the requests which he makes of colleagues practising in other jurisdictions (thus reducing the time and cost of handling his business); and he will want information which will help him to evaluate the replies that he receives from practioners in other jurisdictions.

These considerations affect the transborder transactions of lawyers working in Europe or working on issues concerning multi-national companies with interests throughout Europe and North America. They are immensely complicated by the different treatment of issues under common law systems and civil codes in the countries involved. However, in Europe a new dimension is added by the supra-national legal code of the European Economic Community. Variously estimated at up to one million documents stating statutory requirements, this legal superstructure impinges upon all levels of commercial activity and creates common and international information requirements of its own. The practical application of this body of law is in turn affected by the various ways in which national courts have interpreted it. The latter consideration becomes equally important in the light of the Brussels Convention and the consequent ability of lawyers within one jurisdiction to adopt as precedent decisions made on like issues in the courts of other jurisdictions with the Community.

What information database design can hope to deal with this diversity of requirement? While EUROLEX are young in their own experience of the problem, they believe that the experience of the major legal information providers in the USA, loading very large full-text files of primary source materials, may not be the best guideline to follow in this instance.

The American situation in the legal field has been created by a very particular set of circumstances which reflect both the style of research activity conducted by US lawyers and the fact that the initial database provider to enter the field was not a legal publisher and thus had no proprietory contribution to offer. The European situation is genuinely different, just as it is genuinely international. In many ways the extensive experience of Italgiure-Find is a better guide-line and all European systems must acknowledge their debt to the pioneering work done in Rome during the 1970's.

The analysis which EUROLEX made of the problem led to the creation of a number of hypotheses which are currently under test in the market place.

a) That international database structure in terms of hierarchies of information should parallel quite precisely perceived hierarchies of need and usage. In other words, the loading and storing of legal texts, and the variety of different types of texts used, must be directly related to the ways in which lawyers actually consult and use available information.

b) That international database construction in the legal field should avoid duplication of function and information with national database contruction.

c) The international information should be so structured as to enable users to answer the same enquiry at a number of different levels within the same overall database construction.

We have come to call these three approachs the hierarchical structure, the Gateway approach and the necessity for 'one stop shopping'. While these expressions have different meanings in other database contructions, we must explain what they mean for us:

a) Hierarchical structures. EUROLEX increasingly contains separately searchable files of current awareness, abstract and encyclopedia and full text materials. The combination of the three elements is deliberate. The hierarchy of need is at the least for very up to date brief reports of current activity, creating small files of high value material either searched on full text or by passive browsing. Typically on EUROLEX this might be a newsletter like Eurolaw Commercial Intelligence, detailing court lists, decisions pending, listings of new directives etc. At a second level and supporting this need we have defined a requirement for detailed abstracts with very adequate cross referencing to printed sources. This type of abstract may in fact satisfy all thee requirements of a lawyer seeking background information or doing comparative research. European Law Digest is a file of this type: the definition of need is exemplified by the ELLIS (European Legal Literature Information Service) project, upon which European Law Centre is currently engaged with the Europe-Data division of Elsevier. For similar reasons EUROLEX is pleased to be collaborating with Italgiure-Find on the ENLEX project, as a regional partner in an undertaking with international significance. Finally, the base of the pyramid is provided by full text materials, typically in our cases comprehensive full text law reporting services like Common Market Law Reports, covering not only cases before the European Court of Justice but significant cases within national jurisdictions decided upon issues of EEC law, and full text legislation services, primarily the Official Journal (Legislation Series) of the EEC.

In summary the hierarchy is completed in three tiers, with the smaller files of current awareness materials comprizing the peak of the pyramid, the central part of the structure formed by wide-ranging abstracts of broad genr?r?reral coverage, and the whole structure standing upon a base of full-text information services.

b) The 'Gateway' Approach. Having taken the decision that international components should be harmonized with national jurisdiction requirements in meeting the information requirements of the legal profession, it would be anomalous if EUROLEX attempted to duplicate national provision (beyond providing for UK requirements) in any way. We therefore adopted the approach, in both marketing and database terms, of seeking to provide a service through existing national jurisdiction databases.

Our initial collaborations, within Europe with Italgiure, and outside of Europe with Westlaw in the USA and Computer Law Services in Australia have been very rewarding: we regard them however as a jumping-off point and we have in hand detailed negotiations with other European database providers in order to develop a wider product-based network. At this point the key issues of language and of common command languages come to the fore: they are however beyond the scope of the present paper. It is only worth remarking in database design terms that we do not believe that we can succeed unless we are respectful of differences in patterns of access in different European countries: this means in the legal profession that we have to ensure that our materials are as useful to the lawyer when accessed through an intermediate user service as they are when the lawyer himself is the end-user.

Although in our own experience the end-user pattern predominates we look to the establishment of a European Law Centre Information Desk service to give us practical experience of intermediate user enquiry patterns. Some experience is already available from existing EUROLEX intermediate or 'mid-user' services: typically these are local libraries or, as in Belfast, the courts themselves who offer a service to local practitioners whose pattern of usage does not justify them in becoming end-users themselves. The key questions concern the skills of researchers and their ability to translate vaguely expressed requests into adequate in-depth searches.

c) One-stop Shopping. We have unashamedly borrowed this term from our American counterparts in order to explain the inter-action of each part of our three-tier hierarchical design. The ability to pursue an issue from the current awareness files to abstracts and digests, and eventually, if necessary, to locate the full text which lies behind it seems to us a key design factor. Obviously it creates areas of duplication and redundancy: we feel however that these are tolerable and even welcome provided that the loading of each segment of data in each tier of the structure was justifiable in terms of the original usage forecast for that data.
Duplication in the sense of abstracts and full text of the same case or statute becomes a virtue when enhanced usage is attracted to the wider data window by allowing the user to exploit general questions at the abstract/digest level and then follow through on specific issues into full-text retrieval. We believe that users will not tolerate switching databases or hosts in order to satisfy that type of enquiry: to the working lawyer the terminal should be as effective a library facility as the rows of printed product on the shelf, and his expectation is that he will be able to move through various types of data files in the same way that he can move from volume to volume.

The database provider's design specification must allow him to do this, adding value at each stage with cross-referencing facilities like EUROLEX's Statref (Statute Reference) and citation features.

We believe that the design specification detailed here answers some part of international legal information requirements in Europe. It is vital to us however that if a strong, commercially successful and stable structure of databases is to merge then opportunities should be taken to link market requirements between national juridicial databases. Our cooperation with Italgiure-Find, the first collaboration of its type in Europe, is an early example of what we mean. Database providers must remain felixble enough at the commercial level to exchange pricing structures and utilize each other's marketing strengths in order to consolidate the information profile for end-users.

Thus Westlaw, when marketed by EUROLEX in Europe, is sold on the EUROLEX price tariffs in the early years (at the present time EUROLEX charges are confined to elapsed time only, with no subscription, library rental or minimum usage rates), preserving flexibility and compatibility in terms of use of terminals and communication systems we believe that Europe can acquire inter-related legal information systems which are both commercially viable and seen to be clearly in the interest of the legal end user.

5. The Future

In the immediate future it will be more of the same - more data, more users, more terminals - the reinforcement of success. The user group in London now has its counterpart in Scotland and soonn there will be one in Brussels. Much work will be done on customer liaison and support in order to improve the service given particularly in terms of the user interface and the character of the data available. The role of the user will become more and more important.

However deeper changes will take place which will not be apparent for a year to two. The operational experience gained has been fed into the STATUS design team who are now engaged in a major rewrite of the software. The increasing use of microcomputers for access to EUROLEX and other similar services will lead to software links between full text databases and numerical databases. The so called "expert system" will develop in the legal area, though very slowly and with extreme caution. Hardware and software developments will go hand in hand. Technology is now. The real question is what choice to make.

6. Conclusion

EUROLEX has now arrived as a fully fledged commercial service which is genuinely international in its approach. The service will continue to grow in response to its users who will have an increasing influence on its developments.

EUROLEX Library List

All libraries are kept up to date

1. Criminal Appeal Reports from 1950
2. Current Law Yearbook and Current Law from 1977
3. Common Market Law Reports and European Court Reports from inception 1954
4. European Commercial Cases from inception in 1978
5. European Human Rights Reports from inception 1979
6. European Law Digest from inception in 1973
7. European Patent Office, Official Journal and Appeal decisions from inception in 1979
8. European Treaty Series from inception in 1948
9. Fleet Street Reports of Industrial Property Cases from inception in 1963
10 Financial Times Commercial Law Reports from inception in 1981
11 Industrial Cases Reports from inception in 1972
12 The Official Journal of the European Communities Legislation from 01:01:80
13 Reports of Patent, Design and Trade Mark Cases from 1945
14 Road Traffic Reports from inception in 1970
15 All Published Statutory Instruments from 01:01:81
16 Statutes in Force
17 Scots Law Times from 1960
18 The "Times" Law Reports from 1976
19 Weekly Law Reports from inception in 1953
20 Tax Cases, Annotated Tax Cases, and Tax Case Leaflets from 1950

IFLA 1983

IFLA GENERAL CONFERENCE MUNICH 1983

Division: Libraries serving the general puolic

Section: School libraries

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INFORMATION TECHNOLOGY FOR SCHOOLCHILDREN

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What is Information Technology?

Definition - The acquisition, processing, storage and dissemination of vocal, pictorial, textual, and numerical information by a microelectronics based combination of computing and telecommunications.

Information technology is beginning to affect all our lives. The amount of information in the world is increasing steadily. Recent developments in Information Technology mean that more information is more readily available to more people. The combination of the information explosion and the technological developments mean that steps have to be taken to ensure that children leave school equipped with the knowledge and the skills to enable them to cope with the Information Technology Society.

How will Information Technology change Society? Tom Stonier (1) predicted that in future only 10% of the population will work, and that 50% of those jobs will be information based. All of us use information for work, education, and leisure. All of us need access to information. All of us need to be able to find the right information at the right time. Education must ensure that schoolchildren understand both the potential and the limitations of the technology, and that they are helped to develop good basic information skills.

In Great Britain, during the last decade, a number of research projects have taken place on information handling in schools. In a number of schools, a great deal of emphasis has

been placed on developing Information Skills across the curriculum, although there are still many schools where no structure or emphasis is given to this very important area.

Two needs face the educationists:-

1 - for children to be aware of developments in technology and their potential applications and limitations.

2 - for schoolchildren to develop information skills to be able to exploit Information Technology in their society, rather than be exploited by it.

In 1980, the Department of Education and Science introduced the Microelectronics Education Programme (MEP) (2) to:-

(a) Help equip schools with the technology (supported by the Department of Industry).

(b) Develop good educational programs and materials for the microcomputer.

(c) Train teachers to enable them to exploit these resources in the curriculum.

(d) To initiate and support Curriculum Development.

The MEP programme (2) envisaged effects upon the curriculum in five areas:-

1 - Introduction of new topics in the curriculum.

2 - Development of independent learning and information retrieval.

3 - Use by the mentally and physically handicapped.

4 - New methods of teaching and learning.

5 - Amendment of approach and content in existing subject

areas.

This could mean a re-evaluation of the structure of the curriculum. A number of research projects are being carried out in Great Britain, looking at the implications of Information Technology for the curriculum, and many people agree on it's far reaching effects. These are particularly relevant to the means by which people communicate with each other.

Everyone needs information for work, education, leisure or domestic activities. To survive in an Information Technology Society, schoolchildren need to be aware of the technology, its potential and limitations, and have the right skills to exploit it fully.

In November 1979, the British Library Research and Development Department brought together a number of educational practitioners, policy-makers, librarians, and advisors to discuss training for online information retrieval in secondary schools. The Schools Information Retrieval (SIR) Project (3) evolved from this original meeting.

The SIR project was designed to develop a microcomputer information retrieval system (similiar to existing commercial systems) for use by secondary school students. The objectives of the programs were to assist students in their search for information for school work, to demonstrate in a practical way the principles of modern online information retrieval and to help equip students with the understanding and skills for coping with our increasingly automated world.

The British Library commissioned the programs to run on the Research Machines Ltd. 380Z microcomputer. The package was designed to simulate existing commercial systems, by using a command language and inverted file system for the search programs. The package consisted of a search program and a number of database creation programs.

Schools for the trial phase were selected on the basis of enthusiasm and the ability of the school to incorporate use of the programs into their curriculum. Six institutions were eventually selected, including five schools and one college of further education.

In the two years of program development and school trials, the overall objectives of the project were achieved and a report (3) has now been published by the British Library. The following case study looks in detail at one of the trial school's experiences with SIR.

Isleworth and Syon school has 1000 students aged 11-18 years. At the beginning of the experiment, the librarian and the teaching staff made a joint committment to support the work, an important factor in its overall success. There was already a library skills programme, and a great deal of interaction between the library and the curriculum.

The library is a pleasant place in which to read and work. Tables are available at one end for private study, and in the main body of the library, there are comfortable chairs. Students are able to borrow books, cassettes, and slides. There is an extensive reference collection and video tapes are

available for use in teaching. A good selection of newspapers and journals is also available. The permanent staff (a professional librarian and an assistant) are helped by members of the teaching staff, pupil librarians, and members of the Parent Teacher Association.

Before the SIR project, there were no computer facilities in school. Computer Studies was an option taken by a number of senior boys, on an extra course at a nearby college.

In spite of the lack of facilities, interest in computers was high. As Librarian, I was curious about the potential of the new technology in school libraries. Prior to the arrival of SIR, school had entered an article on "Using Microcomputers in School Libraries" in a competition and won a BBC Microcomputer. Having selected the school as the first trial school for the SIR project, the British Library loaned a microcomputer to the school, which was housed prominently in the library, where there could be free but supervised access.

The Head of the Humanities department and myself attended a two day training course on the project, and the microcomputer was then delivered with the SIR programs and a sample database. Immediately I began to introduce SIR to the school. I felt that it was important to capitalise on the wave of interest aroused by the introduction of the new equipment, and my first task was to train and interest as many of the teaching staff as possible.

During the first three weeks, demonstrations were given to two

thirds of the staff, and to a team of student library monitors. This intensive training programme created extensive interest throughout the school and contributed to the high use of the SIR programs during and beyond the trial period.

After this awareness programme, teaching departments (e.g. Geography, History, Economics, Science, English and Careers) became actively interested in using SIR to support their subject work. Databases were subsequently developed in all these areas and continue to be used in school.

The first groups of students to take part in the trial were third year science students, who used the SIR programs and the sample database to support a project on Energy. Groups were timetabled to visit the library to use the microcomputer, and both teacher and pupil materials were developed to help with training and use. The Head of Geography then developed a small database, which he used with his senior students. Although it was anticipated that SIR would be used by students in the 14 to 18 age range, it was later recognised that since the middle and upper school curriculum is very full, and SIR requires a reasonable amount of time for students to grasp the principles of its use, younger students became the focus of our work.

As librarian, I felt that if eventually all pupils in school were to be familiar with using the microcomputer for information retrieval, then SIR needed to be introduced at a fairly elementary level to the First year students. For this purpose, and with the help of the English department, a Fiction database

was constructed, which enabled students to find types of stories and to be able to carry out a single term search using SIR. In subsequent years they would learn to carry out more sophisticated searches. First year students were also taught how to search for books with particular authors and titles. SIR was included with other library tools in the first year's (aged 11) introduction to the library, which spans a term and is fairly detailed. During the rest of the year, time was made available in normal English lessons for two students, at a time, to obtain supervised experience. In this way all the first year students were taught and had some practical experience.

Class sizes at Isleworth and Syon School in the lower and middle school averaged 25 to 30 students, so the main problem in teaching groups at this level arose from having only one machine available. The whole group was introduced to using the microcomputer for information retrieval within the context of general information retrieval. SIR was explained and how it was to be used. Worksheets were developed to help the students understand SIR and to support the particular project being undertaken. The class was then split into three groups. Two groups used the worksheets and the third was shown in more detail how SIR was to be used. Good wallcharts, help sheets and book marks were produced to support the students in subsequent individual use. Generally speaking the facilities introduced to students included :-

1 - the command FIND with a SINGLE TERM SEARCH.

e.g. FIND windmills — S1 (Search Set 1) tells the user

S1 10 — that there are 10 records in the

SHOW R1-R3 — database where the term "windmills" occurs.

SHOW R1-R3 asks the computer to display on the screen the first three of those 10 records. The student could also use the command PRINT to have the information printed, if the microcomputer is linked to a printer.

SAMPLE RECORD

001 (DOCUMENT NO.)

The Energy crisis. (TITLE)

New Scientist, June, 1980. (BIBLIOGRAPHIC DESCRIPTION)

Reeves, James (AUTHOR)

Article: world resources: nuclear power: pollution: (KEYWORDS)
alternative energy: conservation:industrial waste:
fuel: water power: wind power: solar power: windmills.

The KEYWORDS summarize the subject content of the periodical article.

2 - A TWO TERM SEARCH using the same commands and introducing the logical operator AND.

e.g. FIND wind

S1 50 (all the records containing the term "wind")

FIND power

S2 37 (all the records containimg the term "power")

FIND S1/AND/S2

S3 22 (all the records containing both the terms "solar" and "power")

3 - TERM TRUNCATION

e.g. FIND wind*

50 wind

5 windmill

10 windmills

3 windmobile

S4 64 (all the records containing terms beginning with the letters "wind").

Older students were also introduced to the logical operators OR and NOT.

Once students had been given a detailed talk and demonstration at the microcomputer, they would be encouraged to come back in their own time to practise. Project work or homework was then set and students were expected to use SIR to help them find relevant information for their project.

Since SIR was introduced at the school, the computer has been surrounded every break and lunchtime by a crowd of students. This free access has had very interesting results. Many students have learned to use SIR informally "over the shoulders" of others. The free access and encouragement given to students revealed some surprising results amongst the less able students. I have been most impressed with the ease, with

which some of the lower ability students have come to terms with the computer. SIR was used at Isleworth and Syon across the curriculum, across the age range and across the ability range.

A group of 5th year English students created a database using SIR as part of a project for their examinations. This was the first occasion in school where the students themselves were involved in creating databases. Since then, I have been convinced that one of the best ways to ensure that students understand the potential and the limitations of using a microcomputer for information retrieval is to allow them to create databases themselves.

After using the system myself for almost two and a half years, I have found it to be a sophisticated, speedy and versatile information retrieval system and an excellent tool for teaching modern information retrieval techniques. The school library has been brought into the context of today's world and students have accepted the microcomputer as another tool in their search for information.

The SIR programs demonstrate one of the ways in which computers store information. Databases created by SIR are Inverted Databases, which allow users to search for information using keywords and simulate online systems such as BLAISE.

However it is important that schoolchildren should be introduced to other systems, which store information in very different ways. Another type of database is a Hierarchial database. Here information is stored on pages, which are linked together in a tree structure. The user chooses from a menu of

options, as he or she proceeds from general to specific information. An example of a Hierarchial Database is PRESTEL. Prestel is a large database, stored on a main frame computer, which can now also be easily accessed by linking up through a microcomputer and the telephone system.

The school subsequently participated in a project with the Council for Educational Technology (C.E.T.) on using microcomputer linked PRESTEL and its TELESOFTWARE facilities. This allowed for direct access to computer programs, which were stored on the PRESTEL database and could be transferred directly down the telephone line into the microcomputer in school. These programs could then be used on the school microcomputer. The students were therefore also able to gain experience in searching on a large database and to explore its potential and limitations. C.E.T. have also developed a program called Local Viewdata, which allows the user to create databases, which simulate Prestel on the school microcomputer. A number of databases were created in school using this program, and as well as being useful resources in themselves, they also provided an excellent training tool for simulating online searching using Hierarchial databases.

The London Borough of Hounslow is also currently involved in a project with schoolchildren using microcomputers in junior public libraries for information retrieval. Five of its junior public libraries now have BBC Microcomputers and the libraries are co-operating with nearby primary schools in developing awareness and skills with the children of primary school age (up

to 11 years).

In a paper such as this, it is impossible to cover all aspects or all developments in this ever expanding and developing field. The technology will continue to change and to develop. Schoolchildren leaving school will meet the technology in life beyond school, although the specific machines and software will be very different. These are changing and developing rapidly.

What is essential, irrespective of such developments in technology and software, is that they leave school with an understanding of the basic fundamental principles and concepts involved in Information handling. This will provide the necessary information skills to enable them to cope with the Information Technology Society.

The same basic skills, which are necessary to handle information in traditional formats (e.g. books, periodicals etc.) are the best foundation for coping with the Information Explosion and the Information Society.

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